

Spot On With Numbers Encourages Subitising

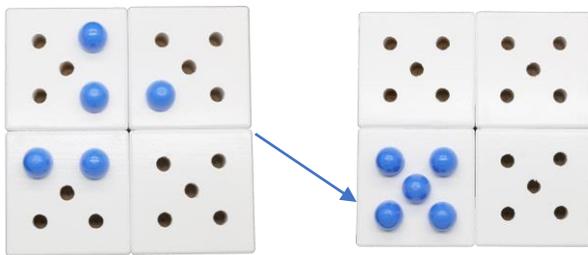
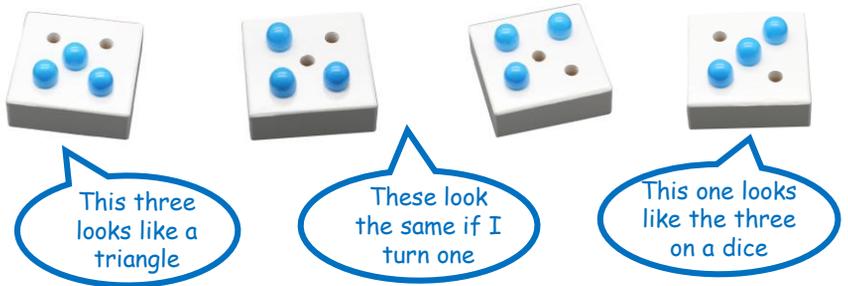
Subitising is the ability to instantly recognise a number of objects without counting them. While concrete and pictorial representations are great for developing conceptual understanding, some resources still require children to count all and the counting trap continues.

Rather than suppressing the use of fingers (which can be used flexibly), it is the reliance on counting in ones or enumerating that should be discouraged. In order for children to be steered away from enumerating, they need to be able to subitise.

Most adults learn to subitise without needing to be taught to as they use their understanding of number and their number facts to help them recognise the number of objects in a group. However, a link has been found between children with difficulties in maths and a lack in the ability to subitise. Work by David Mills has shown that 'subitizing ability in dyscalculic children could be improved into the normal range' and 'their math skills... had also significantly improved' with their ability to subitise (<https://www.dyscalculia.org/research/mills>).

Perceptual subitising is the ability to instantly recognise a number of objects without counting them. Adult humans have an innate ability to subitise up to five objects (interestingly, this instinctual ability can be seen in our primate relatives, where chimpanzees have been reported to subitise up to seven objects!) Children are normally ready to subitise up to five objects by the age of five.

The diagonal encourages us to see a set of objects in many more arrangements, similar to those which could occur in a random collection. It also has links to familiar patterns.

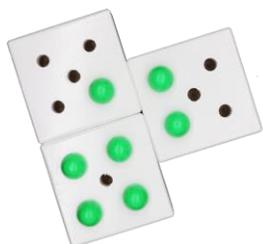
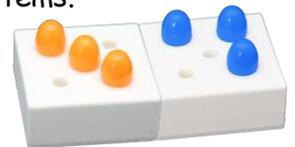


The ability to move the pegs into a familiar pattern also strengthens the link between the random arrangement and the number.

The numbers that make up five for example can also be explored by using different colours (eg two green and three orange to show how five is made up).

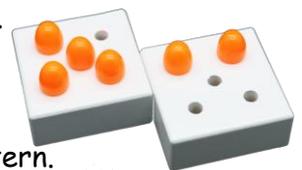
When a set of objects larger than five is quickly recognised, the person has most likely grouped the objects and used their number facts to accurately identify the number of items.

This is called conceptual subitising. Again, this subitising can be encouraged with any concrete or pictorial arrangement, but the five dice formation can be used to scaffold before seeing more difficult arrangements. Furthermore, subitising does not need to be seen as an 'add on' activity, but one that is used every time the child has chosen the pegs and boards resource to support them.



While using the five arrangement for numbers greater than five, the child is also constantly reinforcing number facts.

If more practice is required, the five dice formation can be used to create random arrangements. Again, these can be moved to see the link to a more familiar pattern.

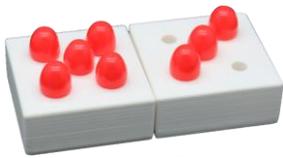


If we are able to instantly recognise up to five objects and then use our number facts to work out the total of a number of objects greater than five, the five dice combination allows us to truly 'see' all these pegs:



Most resources showing ten require a knowledge of how the ten has been created, but with the five formation, all the elements are seen and the number has been truly subitised.

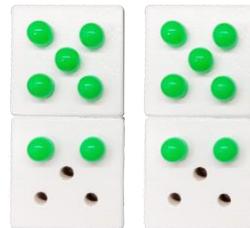
Subitising plays an important role in developing number sense as it encourages children to see how numbers are composed and partitioned and get a sense of the number.



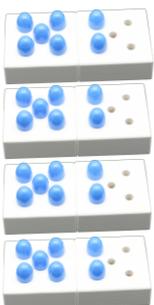
In order to conceptually subitise 8 in this configuration requires knowing that 8 is composed of 5 and 3, but it is also 4 and 4 (or double 4). In both examples, it is clear that 8 is 2 less than 10 as there are 2 empty holes. By playing with colours

and discovering that 8 is also composed of 6 and 2; also knowing that 8 is one more than 7 and one less than 9 by physically adding and removing pegs, all combines to give an 8-ness of eight, thereby developing number sense. If children can see the number 7 and 8 without having to count each set of components in turn, the links become much clearer. When children can see the links, for example in this case that double 4 is 8, they develop fluency through visualising, seeing links or drawing on previous learning.

Subitising can be used to visualise multiplication facts:

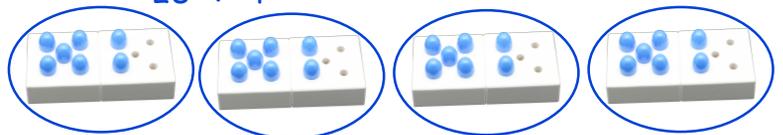


$$7 \times 4$$



Children can see links between multiplication and division.

$$28 \div 4$$



Most resources which can be manipulated, leave a random arrangement which is difficult to be subitised and the links are less evident.

$$\begin{array}{r} 5 \times 4 \\ = 20 \\ + 2 \times 4 \\ = 8 \\ \hline = 28 \end{array}$$